

Answers to Review

1. True/False

1. T
2. F
3. T
4. F
5. T
6. T
7. F
8. F
9. T
10. T

2. Translations • \vee \leftrightarrow \rightarrow

1. Eating animals is morally permissible only if animals feel no pain

E: Eating animals is morally permissible

A: Animals feel no pain

$E \rightarrow A$

2. Stephan has the paints but he does not have the motivation.

S: Stephan has the paints

M: Stephan has the motivation

$S \bullet \sim M$

3. Emma likes the expression 'Matt Damon!' although she is not a big fan of Matt Damon.

E: Emma likes the expression 'Matt Damon!'

F: Emma is a big fan of Matt Damon

$E \bullet \sim F$

4. On the condition that door #1 does not hide a dirty sock and Choosey believes this, Choosey picks door #2.

S: Door#1 hides a dirty sock

C: Choosey believes this [where *this* = $\sim S$]

P: Choosey picks door #2

$$(\sim S \bullet C) \rightarrow P$$

5. If Jones is morally responsible for taking the bread, then Jones was free to choose otherwise. But if Jones was hungry, then Jones was not free to choose otherwise. Jones, by the way, was hungry. So Jones is not morally responsible for taking the bread.

M: Jones is morally responsible for taking the bread

F: Jones was free to choose otherwise

H: Jones was hungry

$$M \rightarrow F$$

$$H \rightarrow \sim F$$

H

So, $\sim M$

6. Slim has neither the soup nor the salad.

P: Slim has the soup

L: Slim has the salad

$$\sim(P \vee L)$$

$$[\text{equivalent: } \sim P \bullet \sim L]$$

7. If it is true that colors exist only if perceivers exist, then colors are mind-dependent. So, it is false that colors are mind-dependent only if colors exist and perceivers do not exist.

C: Colors exist

P: Perceivers exist

M: Colors are mind-dependent

$$(C \rightarrow P) \rightarrow M$$

$$\text{So, } \sim M \rightarrow (C \bullet \sim P)$$

8. A necessary condition on Chris knowing that he has hands is that he knows he is not dreaming. Unfortunately, Chris does not know he is not dreaming. Thus he doesn't know he has hands.

H: Chris knows that he has hands

D: Chris knows he is not dreaming

$$H \rightarrow D$$

$\sim D$

Thus, $\sim H$

9. Either the sun rises tomorrow or I'm not sane. So, if I'm sane then the sun rises tomorrow.

T: The sun rises tomorrow
 S: I'm sane

$T \vee \sim S$
 So, $S \rightarrow T$

3. Complete Truth Tables

1.

P	Q	$\sim(P \vee Q)$		$Q \rightarrow (P \vee Q)$		P	$\therefore P \rightarrow Q$
T	T	F	T	T	T	T	T
T	F	F	T	T	T	F	F
F	T	F	T	T	F	T	T
F	F	T	F	T	F	T	T

This argument is valid. There are no truth-value assignments (read: rows) that make the premises all true and the conclusion false.

2. $\sim[(A \rightarrow B) \bullet \sim A]$, $B \leftrightarrow \sim A$, So, $B \vee (A \rightarrow B)$

A	B	$\sim[(A \rightarrow B) \bullet \sim A]$				$B \leftrightarrow \sim A$		$\therefore B \vee (A \rightarrow B)$	
T	T	T	T	F	F	F	F	T	T
T	F	T	F	F	F	T	F	F	F
F	T	F	T	T	T	T	T	T	T
F	F	F	T	T	T	F	T	T	T

This argument is invalid. Notice on row #2 from the top the premises are true and the conclusion is false.

3. $X \vee (T \rightarrow C)$, $T \bullet \sim C$, $T \leftrightarrow \sim X$ So, $X \bullet C$

X	T	C	$X \vee (T \rightarrow C)$		$T \bullet \sim C$	$T \leftrightarrow \sim X$	$\therefore X \bullet C$
T	T	T	T	T	F F	F F	T
T	T	F	T	F	T T	F F	F
T	F	T	T	T	F F	T F	T
T	F	F	T	T	F T	T F	F
F	T	T	T	T	F F	T T	F
F	T	F	F	F	T T	T T	F
F	F	T	T	T	F F	F T	F
F	F	F	T	T	F T	F T	F

This argument is valid. There are no truth-value assignments (read: rows) that make the premises all true and the conclusion false.

4. Indirect Truth Tables

1. $R \rightarrow [(Z \bullet R) \vee \sim Z]$, $\sim R \vee Z$, $Z \rightarrow (R \leftrightarrow \sim Z)$ So, $R \leftrightarrow \sim Z$

R	Z	$R \rightarrow [(Z \bullet R) \vee \sim Z]$		$\sim R \vee Z$	$Z \rightarrow (R \leftrightarrow \sim Z)$	$\therefore R \leftrightarrow \sim Z$
F	F	T	F	T T	T F T	F T

The argument is invalid. When R and Z are both false, we get true premises and a false conclusion.

2. $R \bullet (D \vee J)$, $\sim J$, $D \rightarrow (R \leftrightarrow J)$ So, $(R \bullet J) \vee (\sim R \bullet \sim J)$

R	D	J	$R \bullet (D \vee J)$		$\sim J$	$D \rightarrow (R \leftrightarrow J)$	$\therefore (R \bullet J) \vee (\sim R \bullet \sim J)$
T	T	F	T	T	T	T/F F	F F F F T

The argument is valid. We see that it is impossible to make the premises true while making the conclusion false. On the way I assigned truth values, this surfaced in the third premise, as indicated by 'T/F'.

3. $L \rightarrow F, L \vee F, F \bullet (O \vee L), \text{ So, } \sim [O \leftrightarrow (L \bullet F)]$

L	F	O	$L \rightarrow F$	$L \vee F$	$F \bullet (O \vee L)$	$\therefore \sim [O \leftrightarrow (L \bullet F)]$
T	T	T	T	T	T T	F T T

The argument is invalid. When L, F, and O are all true, we get true premises and a false conclusion.